

We claim:

1. A diffractive focusing device, comprising:  
a light transmissive substrate; and  
a plurality of selectively light opaque elements formed as part of said light transmissive substrate and capable of being electronically activated;  
wherein particular elements of said plurality of selectively light opaque elements are selectively rendered substantially light opaque or substantially light transmissive in order to create light transmissive channels in said light transmissive substrate, with a diffractive characteristic of said diffractive focusing device being varied in response to a pitch of said light transmissive channels.
2. The device of claim 1, wherein said diffractive focusing device comprises an electrically controllable, variable diffraction grating.
3. The device of claim 1, wherein a selectively light opaque element comprises an LCD.
4. The device of claim 1, wherein a selectively light opaque element is substantially flush with an exterior surface of said light transmissive substrate.
5. The device of claim 1, wherein a selectively light opaque element is substantially linear in shape.
6. The device of claim 1, wherein a selectively light opaque element is substantially annular in shape.

7. The device of claim 1, further comprising a corrective diffractive focusing device that is positioned substantially coaxially with said diffractive focusing device, said corrective diffractive focusing device comprising a second light transmissive substrate and a plurality of spaced-apart, selectively light opaque elements formed in said second light transmissive substrate, wherein a spacing between selectively light opaque elements of said corrective diffractive focusing device is controlled to be less than a spacing between selectively light opaque elements of said diffractive focusing device.

8. The device of claim 1, wherein said plurality of selectively light opaque elements comprises a plurality of substantially contiguous, selectively light opaque elements.

9. The device of claim 1, wherein said plurality of selectively light opaque elements are formed on said light transmissive substrate.

10. The device of claim 1, wherein said plurality of selectively light opaque elements are formed within said light transmissive substrate.

11. An image capturing device, comprising:

an aperture that admits light into said image capturing device;

an image capturing element; and

a diffractive focusing device interposed between said aperture and said image capturing element, said diffractive focusing device comprising:

a light transmissive substrate; and

a plurality of substantially contiguous, selectively light opaque elements formed as part of said light transmissive substrate and capable of being electronically activated;

wherein particular elements of said plurality of selectively light opaque elements are selectively rendered substantially light opaque or substantially light-transmissive in order to create light transmissive channels of varying pitch in said light transmissive substrate and thereby to vary diffractive characteristics of said diffractive focusing device in order to focus said light on said image capturing element from various focal lengths.

12. The device of claim 11, wherein a selectively light opaque element comprises an LCD.

13. The device of claim 11, wherein a selectively light opaque element is substantially annular in shape.

14. The device of claim 11, further comprising a corrective diffractive focusing device that is positioned substantially coaxially with said diffractive focusing device, said corrective diffractive focusing device comprising a second light transmissive substrate and a plurality of spaced-apart, selectively light opaque elements formed in said second light transmissive substrate, wherein a spacing between selectively light opaque elements of said corrective diffractive focusing device is controlled to be less than a spacing between selectively light opaque elements of said diffractive focusing device.

15. A method of focusing light, comprising the steps of:  
providing a light transmissive substrate;  
forming a plurality of selectively light opaque elements as part of said light transmissive substrate; and  
selectively activating selectively light opaque elements in order to create light transmissive channels of varying pitch in said light transmissive substrate so as to focus light from varying focal lengths.

16. The method of claim 15, wherein the forming step comprises forming said plurality of selectively light opaque elements substantially flush with an exterior surface of said light transmissive substrate.

17. The method of claim 15, wherein the forming step comprises forming said plurality of selectively light opaque elements on said light transmissive substrate.

18. The method of claim 15, wherein the forming step comprises forming said plurality of selectively light opaque elements within said light transmissive substrate.

19. The method of claim 15, wherein the forming step comprises forming said plurality of selectively light opaque elements in a substantially linear shape.

20. The method of claim 15, wherein the forming step comprises forming said plurality of selectively light opaque elements in a substantially annular shape.

21. The method of claim 15, wherein the forming step further comprises forming a plurality of spaced-apart LCD elements in said light transmissive substrate.

22. The method of claim 15, wherein the forming step further comprises forming a plurality of substantially contiguous, selectively light opaque elements.

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23. A method of focusing light, comprising the steps of:

forming a plurality of light transmissive channels in a light transmissive substrate; and

varying a pitch of a light transmissive channel so as to vary a corresponding diffraction characteristic.

24. The method of claim 23, wherein the varying step further comprises activating one or more selectively light opaque elements to form predetermined channel pitches.

25. The method of claim 23, wherein the forming step further comprises forming a plurality of substantially contiguous, spaced-apart LCD elements in said light transmissive substrate.